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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,633	10/30/2001	Martin Peiter	SC0142WD	4073

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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 03/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

<b>Office Action Summary</b>	<b>Application No.</b> 10/016,633	<b>Applicant(s)</b> PEITER ET AL.	
	<b>Examiner</b> Binh X Tran	<b>Art Unit</b> 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.  
4a) Of the above claim(s) 18-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 28-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-30 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/16/2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I (claims 1-17, 28-30) in Paper filed on 09-12-2003 is acknowledged.
2. Claims 18-27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper filed on 09-12-2003.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 16, the examiner cannot find the support for the limitation that the "depth of said pit is within the range between 3  $\mu$ m and 10 mm" (emphasis added). Applicants disclose in page 6 (5<sup>th</sup> paragraph) that the depth is within 3-10  $\mu$ m (not 10 mm).

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claim 1-17, 28-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 28, "whereas the pit is deep enough to remain a pit ... said wafer" (emphasis added) is vague and indefinite. It is unclear from the claim what specific depth ranges that one can consider as "deep enough".

In claim 11, "the beam parameters for removal ... are matched" is indefinite. It is unclear from the claim what other parameters the "beam parameters" will be matched with. The beam parameters cannot be matched with themselves.

In claim 15, "said holes" lacks antecedent basis.

Claims 2-17, 29-30 are indefinite because they directly or indirectly depend on indefinite claim 1 or claim 28.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3-6, 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato et al. (US 6,156,676).

Sato discloses a method of laser marking comprising the step of:

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directing a defined beam onto the wafer (2) by means of beam generator (i.e. laser source) to remove some wafer material from a wafer region, characterized by generating a first radiation pulse (i.e. laser radiation beam 7) having a predetermined energy density and used to create a deep pit in the wafer (i.e., laser marking region), whereas the pit remain throughout subsequent manufacturing steps of the wafer (Fig 1B, col. 3 line 63 to col. 4 lines 10).

Respect to claim 3, Sato discloses that laser is used as a beam generator means. Respect to claims 4-6, 8, Sato teaches to flow a gas jet of N<sub>2</sub> toward the edge of wafer edge so that the particles generated can be removed by a vacuum pump (6) (Fig 1B, col. 4-5).

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 2, 7, 9, 13, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Chen et al. (US 6,214,703).

Respect to claim 2, Sato fails to disclose local plasma is generated for creating the pit. However, Sato clearly discloses the step of flowing a gas over the laser marking area to enhance the removal process. In a method for create deep trench using laser marker, Chen teaches to form plasma to create the deep trench or deep pit. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Sato in view of Chen by generating local plasma because it will enable the formation of scribe lines that are both narrow and deeply penetrated into the wafer.

Respect to claim 9, Sato fails to disclose that a sacrificial layer is applied on the wafer before deep pit is created, and the sacrificial layer is subsequently removed. Chen teaches to form a photoresist layer (read on "sacrificial layer") before the deep pit is created and subsequently removed. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Sato in view of Chen by using the sacrificial layer because it will protect the substrate during the removing step.

Respect to claim 7, Chen discloses using inert gas such as helium. Respect to claim 13, Chen discloses a plurality of mutually spaced deep pits is created. Respect to claims 16-17, Chen discloses the depth of the pit is within 6-8  $\mu\text{m}$  (col. 6 lines 44-45, within applicants' range).

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12. Claim 10-11, 13, 15, 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Kestenbaum (US 4,044,222).

Respect to claim 10, Sato does not explicitly disclose any residual remains on the wafer are reduced or removed by subsequent evaporating step using a second radiation pulse. In a method to create apertures, Kestenbaum discloses the materials around the aperture (i.e. pit) are removed by evaporating step using plurality of radiation pulse (read on "second radiation pulse", col.5 lines 1-5, line 65-68). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Sato in view of Kestenbaum by using a second radiation pulse because it will help to remove residue and to form a tempered aperture.

Respect to claim 11, Kestenbaum teaches to control the parameters such as wavelength, temperature gradient of the radiation pulse during the removal step. Respect to claim 13, Kestenbaum discloses a plurality of mutually spaced deep pits is created. Respect to claim 15, Kestenbaum teaches that the apertures are created by means of first radiation pulse and then all apertures are subjected to additional radiation pulse (Fig 1-2, col. 5 lines 65-67, col. 7 lines 15-30). Respect to claim 28-30, Kestenbaum teaches to use plurality of laser pulse to form a tempered aperture (read on "second radiation beam" and "the edge of the pit is smooth").

13. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Tanimoto et al. (US 5,597,590)

Respect to claim 12, Sato fails to disclose a second radiation pulse is generated has a lower energy density compared to the first radiation pulse. Tanimoto teaches to

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adjust the energy density of the beam through out the removal process so that only the desire portion of the film will be removed (col. 25-26). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Sato in view of Tanimoto by adjusting energy density to a lower level comparing with the initial level because this would control the selectivity of the removal process. Further, Tanimoto teaches energy density is a result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment, to obtain optimal energy density level as an expected result.

Respect to claim 13, Tanimoto discloses plurality of mutually space of the pit is created (Fig 15). Respect to claim 14, Tanimoto teaches to create a pitch using plurality of laser pulse before the creation of another pit.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G Norton can be reached on (571) 272-1465. The fax phone



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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Binh X. Tran

NADINE G. NORTON  
PRIMARY EXAMINER

